CRASH DATA RESEARCH CENTER

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CALSPAN ON-SITE CERTIFIED ADVANCED 208-COMPLIANT VEHICLE CRASH INVESTIGATION

SCI CASE NO.: CA08040

VEHICLE: 2008 SATURN AURA

LOCATION: NORTH CAROLINA

CRASH DATE: JULY 2008

Contract No. DTNH22-07-C-00043

Prepared for:

U.S. Department of Transportation
National Highway Traffic Safety Administration
Washington, D.C. 20590

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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points are coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

TECHNICAL REPORT STANDARD TITLE PAGE

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16. Abstract This on-site investigation focused on the deployment of the driver's frontal air in a 2008 Saturn Aura that was equipped with a Certified Advanced 208-Compliant (CAC) frontal air bag system. The Aura was also equipped with seat back mounted side impact air bags and inflatable curtain air bags. The manufacturer of the Aura has certified that the vehicle is compliant with the advanced air bag portion of Federal Motor Vehicle Safety Standard (FMVSS) No. 208. The CAC system included dual stage frontal air bags for the driver and front right passenger positions, seat track positioning sensors, a front right occupant detection system, and safety belt retractor pretensioners. The vehicle was occupied by an unrestrained 26-year-old male driver. The driver's frontal air bag deployed as a result of a frontal impact with a utility pole. The driver sustained moderate injuries; however, he refused medical treatment. The Event Data Recorder (EDR) was removed from the vehicle and the data was imaged. The imaged data is included as **Attachment A** of this report.			
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BACKGROUND

This on-site investigation focused on the deployment of the driver's frontal air in a 2008 Saturn Aura **(Figure 1)** that was equipped with a Certified Advanced 208-Compliant (CAC) frontal air bag system. The Aura was also equipped with seat back mounted side impact air bags and inflatable curtain air bags. The manufacturer of the Aura has certified that the vehicle is compliant with the advanced air bag portion of Federal Motor Vehicle Safety Standard (FMVSS) No. 208. The CAC system included dual stage frontal air bags for the driver and front right passenger positions, seat track positioning sensors, a front right occupant detection system, and safety belt retractor pretensioners. The vehicle was occupied by an unrestrained 26-year-old male driver. The driver's frontal air bag deployed as a result of a frontal impact with a utility pole. The driver sustained moderate injuries; however, he refused medical treatment. The Event Data Recorder (EDR) was removed from the vehicle and the data was imaged. The imaged data is included as **Attachment A** of this report.

Figure 1. 2008 Saturn Aura.

The crash was identified through a review of Police Accidents Reports (PARs) that were submitted by the National Automotive Sampling System (NASS) to the Crash Investigation Division (CID) of the National Highway Traffic Safety Administration (NHTSA). The PAR was forwarded to the Calspan Special Crash Investigations (SCI) team on September 5, 2008 for follow-up of a potential on-site CAC investigation. The Saturn was located at a regional insurance salvage facility and permission to inspect the vehicle and remove the EDR for imaging was obtained from the insurance company. The July 2008 crash was subsequently assigned for on-site investigation on September 8, 2008. The on-site investigation was conducted on September 9, 2008. The investigation involved the inspection and documentation of the Saturn and the crash site. The SCI investigator visited the driver's residence in an attempt to locate the driver for an interview, but was unsuccessful.

SUMMARY

Crash Site

The crash occurred during the nighttime hours at a four-leg intersection. The vehicle was traveling southbound approaching the intersection. The north and southbound legs were configured with four through traffic, two left turn only lanes, and a right turn only lane. A bus lane that terminated north of the intersection was present on the northbound leg. The asphalt surfaced travel lanes were separated by raised concrete medians that were bordered by mountable curbs. A raised concrete gore was present at the ends of the right turn only lanes. The gore was bordered by a positively sloped concrete edge. The east/westbound legs of the intersection consisted of six lanes. The east/westbound legs were configured with two through traffic lanes, a center left turn only lane, and a right turn only lane. The travel lanes were bordered by concrete barrier curbs. The vehicle traversed the intersection and departed the southwest roadside. The roadside contained a concrete sidewalk, grass, utility poles, guy wires, and shrubs. The Scene Schematic is included as **Figure 10** at the end of this narrative report.

Vehicle Data – 2008 Saturn Aura

The case vehicle was a 2008 Saturn Aura XE, four-door sedan that was identified by Vehicle Identification Number (VIN) 1G8ZS57N78F (production number deleted). The Saturn was powered by a 3.5-liter V-6 transverse mounted engine linked to a four-speed automatic transmission with front wheel drive. The service brakes were power assisted four-wheel disc with an Anti-lock Braking System (ABS). The Saturn was also equipped with Traction Control and Electronic Stability Control. The tires were OEM Hankook Optimo H725A all-season radials; size P225/50R17, mounted on OEM alloy wheels. The vehicle manufacturer recommended cold front and rear tire pressured was 207 kPa (30 PSI). The Saturn was equipped with an indirect Tire Pressure Monitoring System. The specific tire data at the time of the SCI inspection was as follows:

Position	**Measured Tire Pressure**	**Measured Tread Depth**	**Tire/Wheel Damage**
Left Front	Tire flat	7 mm (9/32”)	Tire de-beaded
Left Rear	Tire flat	6 mm (8/32”)	Tire de-beaded
Right Front	186 kPa (27 PSI)	7 mm (9/32”)	None
Right Rear	Tire flat	7 mm (9/32”)	Cut sidewall

The interior of the Saturn was configured with five–passenger seating that consisted of front bucket seats and a second row bench seat. The outboard seating positions were equipped with height adjustable head restraints. The driver’s head restraint was adjusted 4 cm (1.6”) above the full-down position. The driver’s seat track was adjusted to a mid-track position. The safety systems consisted of three-point lap and shoulder belt systems for the five designated seating positions, dual stage CAC frontal air bags, front seat back mounted side impact air bags and inflatable curtain air bags. The front safety belts were equipped with retractor pretensioners.

Crash Sequence

Pre-Crash

The unrestrained 26-year-old male driver was operating the Saturn in a southerly direction in the right turn only lane approaching the intersection **(Figure 2)** while under the influence of alcohol. Post-crash testing revealed a BAC of .09. Witnesses, including an off-duty police officer, observed the Saturn as it approached the intersection. One of the witnesses estimated the travel speed to be between 129-161 km/h (80-100 mph). The EDR data indicated that the vehicle speed was 153 km/h (95 mph) five seconds prior to Algorithm Enable (AE).

The driver's intention was to turn right at the intersection as he was en route to his residence. As the driver attempted a right turn at high speed, the Saturn continued its southerly travel direction and initiated a slight CW yaw. The investigating officer documented 37.5 (123 feet) of tire marks on the right turn only lane leading to the raised concrete gore. The Saturn departed the left side of the lane and mounted the gore as it rotated CW evidenced by off-tracking tire marks **(Figure 3)**. The tire marks were documented on the gore area. The left side mark measured 6.9 meters (22.6 feet) and the right side mark measured 4.6 meters (15 feet) in length. The Saturn entered and crossed the westbound travel lanes as it began to return to a tracking mode. The Saturn continued 7.5 meters (24.6 feet) in a southerly travel direction as it traversed the westbound travel lanes.

Figure 2. Pre-crash approach in the right turn only lane.

Figure 3. Saturn's travel across the concrete gore.

Crash

The undercarriage impacted the curb (Event 1) that bordered the center median **(Figure 4)**. This impact resulted in two tire marks on the curb and median with multiple gouges to the referenced area. The Saturn traveled an additional 15 meters (49 feet) traversing the median and the eastbound travel lanes where it impacted the south curb with the undercarriage (Event 2). The vehicle mounted the curb and entered the roadside where it traveled 5.6 meters (18.4 feet) and struck a utility pole (Event 3) with the front left corner **(Figure 5)**. As the vehicle crushed, the left front tire engaged the pole. This contact sheared the left tire and wheel from the axle. The utility pole was damaged from this

impact and was replaced prior to the SCI scene inspection. The Saturn rotated CCW approximately 130 degrees and came to rest near the pole facing a northeasterly direction.

The imaged EDR data showed that the brakes were applied during the crash sequence which reduced the speed to 34 km/h (21 mph) one second prior to AE, and that the ABS activated from three-to-one seconds prior to AE. The EDR recorded respective longitudinal and lateral delta-V's of 50.2 km/h (-31.18 mph) which occurred at 150 milliseconds from AE, and 6.6 km/h (4.07) that occurred at 100 milliseconds from AE. The barrier equivalent algorithm of the WINSMASH program calculated a delta-V of 24 km/h (14.9 mph).

Figure 4. Undercarriage impact to the median.

Figure 5. Curb and utility pole impact.

Post-Crash

Police and emergency medical personnel responded to the crash site. The driver sustained moderate severity injuries and refused medical treatment. The Saturn sustained disabling damage and was towed from the crash site. The vehicle was deemed a total loss by the insurance company and transferred to a salvage facility where it was later inspected.

Vehicle Damage

Exterior

The 2008 Saturn Aura sustained moderate severity damage from this multiple event crash. The damage from the impacts to the center median curb and the south curb (Events 1 and 2) involved the undercarriage of the Saturn. The undercarriage could not be inspected as the left front wheel was missing thereby restricting access to the undercarriage. The Collision Deformation Classifications (CDCs) assigned to these impacts were as follows: 12-UFDW-99 and 12-UFDW-99 (99 = unknown).

The Saturn sustained damage to the front and left side planes as a result of the utility pole impact. The damaged components included, but were not limited to, the bumper fascia, bumper beam, hood, left fender, and the left front wheel and suspension components. The direct contact damage began 36 cm (14.1") left of the centerline and extended 57 cm (22.4") to the left corner of the vehicle. The maximum crush measured 28 cm (11") and

was located on the corner of the left bumper beam. Six equidistant crush measurements were documented along the bumper beam of the vehicle and were as follows: C1 = 28 cm (11”), C2 = 20 cm (7.9”), C3 = 13 cm (5.1”), C4 = 6 cm (2.4”), C5 = 0 cm, C6 = 0 cm.

The damage from the utility pole extended down the left side of the vehicle. As the vehicle reached maximum engagement, the left front wheel engaged the pole. This engagement sheared the left front wheel from the axle. The Collision Deformation Classification (CDC) for the pole impact was 12-FLEE-4. **Figures 6 and 7** depict the residual damage to the front and left side planes.

Figure 6. Residual frontal damage.

Figure 7. Damage to the left front aspect of the vehicle.

Interior

The interior of the Saturn sustained moderate damage that was associated with passenger compartment intrusion and occupant contact. The driver’s toe pan was displaced rearward approximately 5 cm (2”) and the floor buckled upward 5 cm (2”) as a result of the pole impact and subsequent separation of the axle and suspension components. The unrestrained driver initiated a forward trajectory in response to the frontal pole impact. The driver’s right hand contacted and displaced the rearview mirror forward into the windshield. This contact was evidenced by the displaced rearview mirror and the fractured windshield. The driver’s torso loaded the deployed air bag resulting in the forces to be transmitted into the steering column. The loading compressed the steering column approximately 4 cm (1.5”). Two knee contacts were noted on the knee bolster. **Figure 8** is an overall view of the driver’s area.

Figure 8. Overall view of the driver's side area.

Frontal Air Bag System

The Saturn Aura was equipped with CAC frontal air bag system that consisted of dual stage air bags, seat track positioning sensors, and an occupant sensing system in the front right seat cushion. The vehicle manufacturer has certified that the Aura is compliant with the advanced air bag portion of the Federal Motor Vehicle Safety Standard (FMVSS) No. 208. The driver was the sole occupant in the vehicle at the time of the crash and the CAC system suppressed the front right air bag. The driver's air bag deployed during the frontal impact with the utility pole **(Figure 9)**. Based on the imaged data from the EDR, a two-stage deployment was commanded. The first stage was commanded at 24 milliseconds of AE, followed by the second-stage at 26 milliseconds.

The driver's frontal air bag was contained within the three-spoke steering wheel rim and concealed by a tri-flap module cover. A narrow rectangular flap that measured 4 x 13 cm (1.6 x 5.1") was positioned across the top of the module with two I-configuration flaps immediately below. Both I-flaps were 14 cm (5.5") in height. The left and right flaps measured 9 cm (3.5") and 6 cm (2.4") in width, respectively. All flaps opened at the designated tear seams and there was no damage or occupant contact evidence to the flaps.

Figure 9. Deployed driver's frontal air bag.

The air bag membrane was 62 cm (24.4") in diameter in its deflated state. The air bag was internally tethered by two bands at the 12 and 6 o'clock positions. Two vent ports were located on the back side of the bag at the 11 and 1 o'clock positions. The face of the air bag contained black vinyl transfers that resulted from expansion of the bag within the module assembly. There was no damage to the air bag or evidence of driver loading.

Side Impact Air Bag System

The Aura was equipped with seat back mounted side impact air bags for the driver and front right positions. The modules were mounted in the outboard aspects of the seat backs with externally visible module assemblies. In addition to the seat back air bags, the Aura was also equipped with inflatable curtain air bags that provided protection to the four outboard positions. The inflatable curtain air bags were incorporated into the headliner at the side rails. The Saturn did not sustain a side impact and the side impact air bag system was not commanded to deploy.

Manual Safety Belt Systems

The Saturn Aura was equipped with 3-point lap and shoulder belts for the five designated seated positions. All belt systems consisted of continuous loop webbing with sliding latch plates. The driver's belt retracted onto an Emergency Locking Retractor (ELR) while the other four belts utilized an ELR and an Automatic Locking Retractor (ALR).

Both front safety belt systems were equipped with adjustable D-rings. The driver's side was adjusted to the full-up position while the front right was set to the mid-position, 7 cm below full-up. Retractor pretensioners were incorporated into the front safety belt systems. Both pretensioners actuated during the crash.

The driver was not restrained by the manual safety belt system. The actuated pretensioner locked the belt in the stowed position against the B-pillar. The latch plate was positioned against the forward aspect of the seat back mounted air bag module. As the retractor pretensioner actuated, the latch plate was deflected by the taut belt webbing and snagged the air bag trim, partially separating the trim from the leading aspect of the module assembly. The side impact air bag did not deploy.

Event Data Recorder

The Saturn was equipped with a Sensing and Diagnostic Module (SDM) that controlled air bag deployments and diagnostic functions and had Event Data Recording (EDR) capabilities. The SDM was mounted to the top of the center tunnel aft of the transmission shifter and was concealed by the center console. The insurance company granted permission to the SCI team to remove the SDM for imaging. The imaged EDR data showed that the recording for this event was complete and no additional events were associated with this deployment file. The EDR data supported the suppression of the front right air bag, unbuckled status of the driver, and the firing of the front safety belt pretensioners. The summary of the imaged data from the EDR is included as **Attachment A** of this report.

Driver Demographics/Data

Age/Sex:	26-year old/Male
Height:	Unknown
Weight:	Unknown
Seat Track Position:	Mid-track position
Eyewear:	Unknown
Safety Belt Use:	None
Usage Source:	Vehicle inspection
Egress from Vehicle:	Exited vehicle unassisted through the left front door
Type of Medical Treatment:	Refused treatment at scene

Driver Injuries

Injury	Injury Severity (AIS90/Update 98)	Injury Source
Unknown, police reported moderate injury	Unknown	Unknown

Driver Kinematics

The 26-year-old male driver of the 2008 Saturn was seated in a mid-track position with the seat back reclined 20 degrees aft of vertical and the head restraint adjusted 4 cm (1.6") above the full-down position. He was not restrained by the manual safety belt system. The lack of belt usage was determined from the position of the safety belt as the

retractor pretensioner actuated during the crash. The belt was stowed against the B-pillar and the retractor pretensioner tensioned and locked the belt in this position.

The first two events of the crash involved the undercarriage which impacted the curbed median and curb on the south roadside. These events were minor and did not displace the driver. The vehicle continued south beyond the curb traveling a distance of 5.6 meters (18.4 feet) and impacted the utility pole.

The impact with the utility pole actuated the safety belt pretensioners and deployed the driver's frontal air bag (stage two deployment). The driver responded to the frontal crash forces and initiated a forward trajectory. He loaded the deployed CAC air bag and the steering assembly with his torso. The driver's loading force compressed the energy absorbing steering column approximately 4 cm (1.5"). There was no deformation of the steering wheel rim. The driver's knees contacted the knee bolster on each side of the steering column.

The driver's right hand contacted and displaced the rear view mirror into the windshield. The mirror was displaced from its mount and the windshield was fractured from contact by the mirror.

The driver sustained police reported moderate injuries and refused medical treatment. He was subsequently charged with an alcohol related violation.

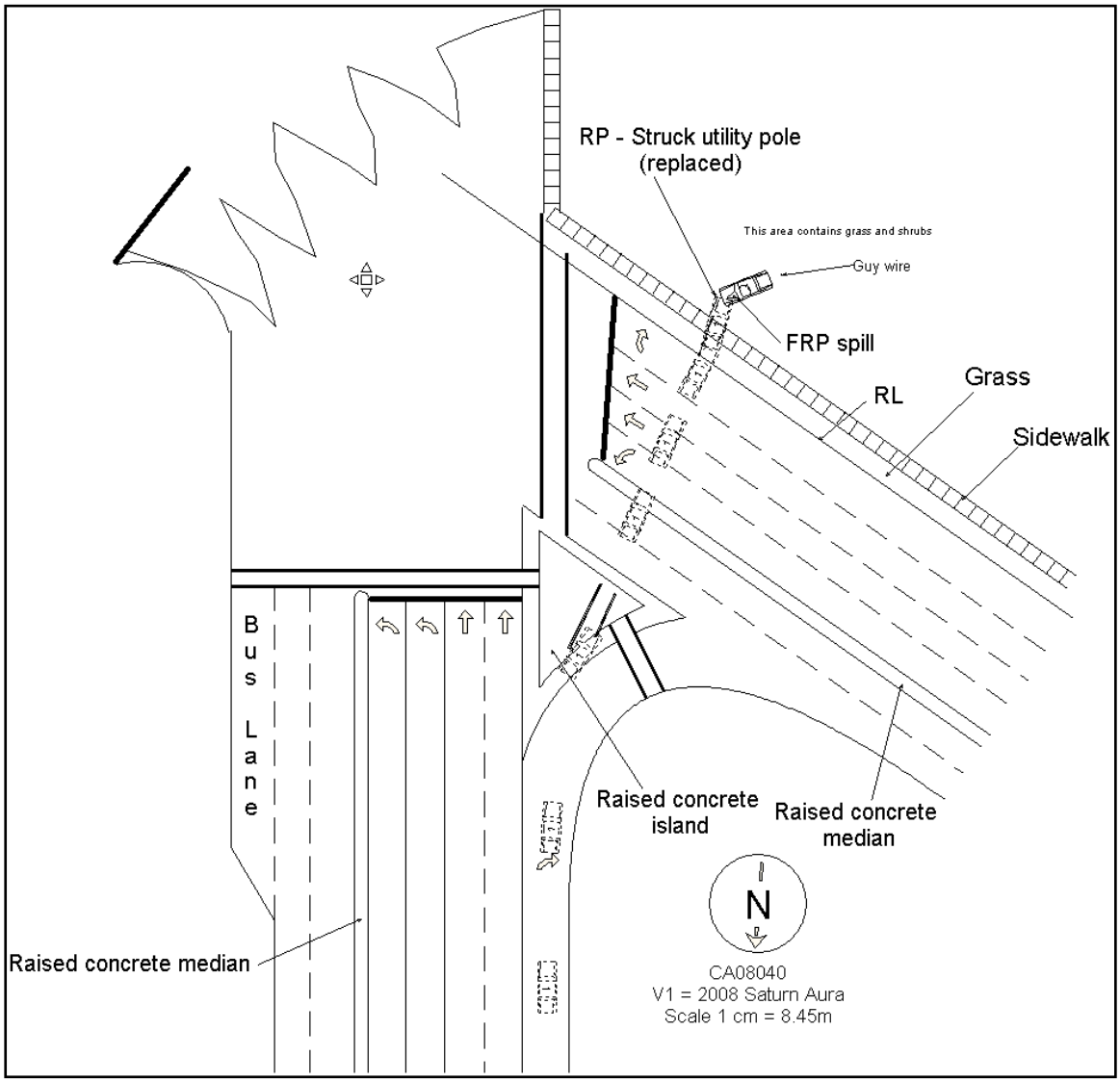


Figure 10: Scene Schematic

Attachment A: Imaged EDR Data

CDR File Information

User Entered VIN	1G8ZS57N78F******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	WITHOUTVIN.CDR
Saved on	Wednesday, May 27 2009 at 10:38:30 AM
Collected with CDR version	Crash Data Retrieval Tool 3.2
Reported with CDR version	Crash Data Retrieval Tool 3.2
EDR Device Type	airbag control module
Event(s) recovered	Deployment

IMPORTANT NOTICE: Robert Bosch LLC recommends that the latest production release of Crash Data Retrieval software be utilized when viewing, printing or exporting any retrieved data from within the CDR program. This ensures that the retrieved data has been translated using the most recent information including but not limited to that which was provided by the manufacturers of the vehicles supported in this product.

Data Limitations

Recorded Crash Events:

There are two types of recorded crash events. The first is the Non-Deployment Event. A Non-Deployment Event records data but does not deploy the air bag(s). The minimum SDM Recorded Vehicle Velocity Change, that is needed to record a Non-Deployment Event, is five MPH. A Non-Deployment Event contains Pre-Crash and Crash data. The SDM can store up to one Non-Deployment Event. This event can be overwritten by an event that has a greater SDM recorded vehicle velocity change. This event will be cleared by the SDM, after approximately 250 ignition cycles. This event can be overwritten by a second Deployment Event, referred to as Deployment Event #2, if the Non-Deployment Event is not locked. The data in the Non-Deployment Event file will be locked, if the Non-Deployment Event occurred within five seconds of a Deployment Event. A locked Non Deployment Event cannot be overwritten or cleared by the SDM.

The second type of SDM recorded crash event is the Deployment Event. It also contains Pre-Crash and Crash data. The SDM can store up to two different Deployment Events. If a second Deployment Event occurs any time after the Deployment Event, the Deployment Event #2 will overwrite any non-locked Non-Deployment Event. Deployment Events cannot be overwritten or cleared by the SDM. Once the SDM has deployed an air bag, the SDM must be replaced.

Data:

-SDM Recorded Vehicle Velocity Change reflects the change in velocity that the sensing system experienced during the recorded portion of the event. SDM Recorded Vehicle Velocity Change is the change in velocity during the recording time and is not the speed the vehicle was traveling before the event, and is also not the Barrier Equivalent Velocity. For Deployment Events, the SDM will record 220 milliseconds of data after deployment criteria is met and up to 70 milliseconds before deployment criteria is met. For Non-Deployment Events, the SDM can record up to the first 300 milliseconds of data after algorithm enable. Velocity Change data is displayed in SAE sign convention.

-Maximum Recorded Vehicle Velocity Change is the maximum square root value of the sum of the squares for the vehicle's combined "X" and "Y" axis change in velocity.

-Event Recording Complete will indicate if data from the recorded event has been fully written to the SDM memory or if it has been interrupted and not fully written.

-SDM Recorded Vehicle Speed accuracy can be affected by various factors, including but not limited to the following:

- -significant changes in the tire's rolling radius
- -final drive axle ratio changes
- -wheel lockup and wheel slip

-Brake Switch Circuit Status indicates the open/closed state of the brake switch circuit.

-Pre-Crash data is recorded asynchronously.

-Pre-Crash Electronic Data Validity Check Status indicates "Data Invalid" if:

- -the SDM receives a message with an "invalid" flag from the module sending the pre-crash data
- -no data is received from the module sending the pre-crash data
- -no module is present to send the pre-crash data

-Driver's and Passenger's Belt Switch Circuit Status indicates the status of the seat belt switch circuit, except: The Passenger Belt Switch Circuit Status for 2005 vehicles is available only on the Cadillac STS. The Passenger Belt Switch Circuit Status for 2006 Chevrolet Cobalt Sport Coupe (AP) model vehicles, with the option package that includes Recaro brand seats (RPO ALV), always reports a default value of "Buckled," because there is no passenger belt switch with the Recaro seat option.
-The Time Between Non-Deployment to Deployment Events is displayed in seconds. If the time between the two events is greater than five seconds, "N/A" is displayed in place of the time. If the value is negative, then the Deployment Event occurred first. If the value is positive, then the Non-Deployment Event occurred first.
-If power to the SDM is lost during a crash event, all or part of the crash record may not be recorded.
-The ignition cycle counter relies upon the transitions through OFF->RUN->CRANK power-moding messages, on the GMLAN communication bus, to increment the counter. Applying and removing of battery power to the module will not increment the ignition counter.
-Steering Wheel Angle data is displayed as a positive value when the steering wheel is turned to the right and a negative value when the steering wheel is turned to the left, except for Cadillac STS model vehicles with StabiliTrak 3.0 systems (RPO JL7). For Cadillac STS model vehicles with StabiliTrak 3.0 systems (RPO JL7), when the steering wheel is turned to the right, a negative value will be displayed and when the steering wheel is turned to the left, a positive value will be displayed. The Steering Wheel Angle data is reported in 16 degree increments.

Data Source:
All SDM recorded data is measured, calculated, and stored internally, except for the following:
-Vehicle Status Data (Pre-Crash) is transmitted to the SDM, by various vehicle control modules, via the vehicle's communication network.
-The Belt Switch Circuit is wired directly to the SDM.

Multiple Event Data

Associated Events Not Recorded	0
An Event(s) Preceded the Recorded Event(s)	No
An Event(s) was in Between the Recorded Event(s)	No
An Event(s) Followed the Recorded Event(s)	No
The Event(s) Not Recorded was a Deployment Event(s)	No
The Event(s) Not Recorded was a Non-Deployment Event(s)	No

System Status At AE

Vehicle Identification Number	**8ZS57N*8*******
Low Tire Pressure Warning Lamp (If Equipped)	OFF
Vehicle Power Mode Status	Run
Remote Start Status (If Equipped)	Inactive
Run/Crank Ignition Switch Logic Level	Active
Brake System Warning Lamp (If Equipped)	OFF

System Status At 1 second

Transmission Range (If Equipped)	Fourth Gear
Transmission Selector Position (If Equipped)	Fourth Gear
Traction Control System Active (If Equipped)	No
Service Engine Soon (Non-Emission Related) Lamp	OFF
Service Vehicle Soon Lamp	OFF
Outside Air Temperature (degrees F) (If Equipped)	82
Left Front Door Status (If Equipped)	Closed
Right Front Door Status (If Equipped)	Closed
Left Rear Door Status (If Equipped)	Unused
Right Rear Door Status (If Equipped)	Unused
Rear Door(s) Status (If Equipped)	Closed

Pre-crash data

Parameter	-2 sec	-1 sec
Reduced Engine Power Mode	OFF	OFF
Cruise Control Active (If Equipped)	No	No
Cruise Control Resume Switch Active (If Equipped)	No	No
Cruise Control Set Switch Active (If Equipped)	No	No

Pre-Crash Data

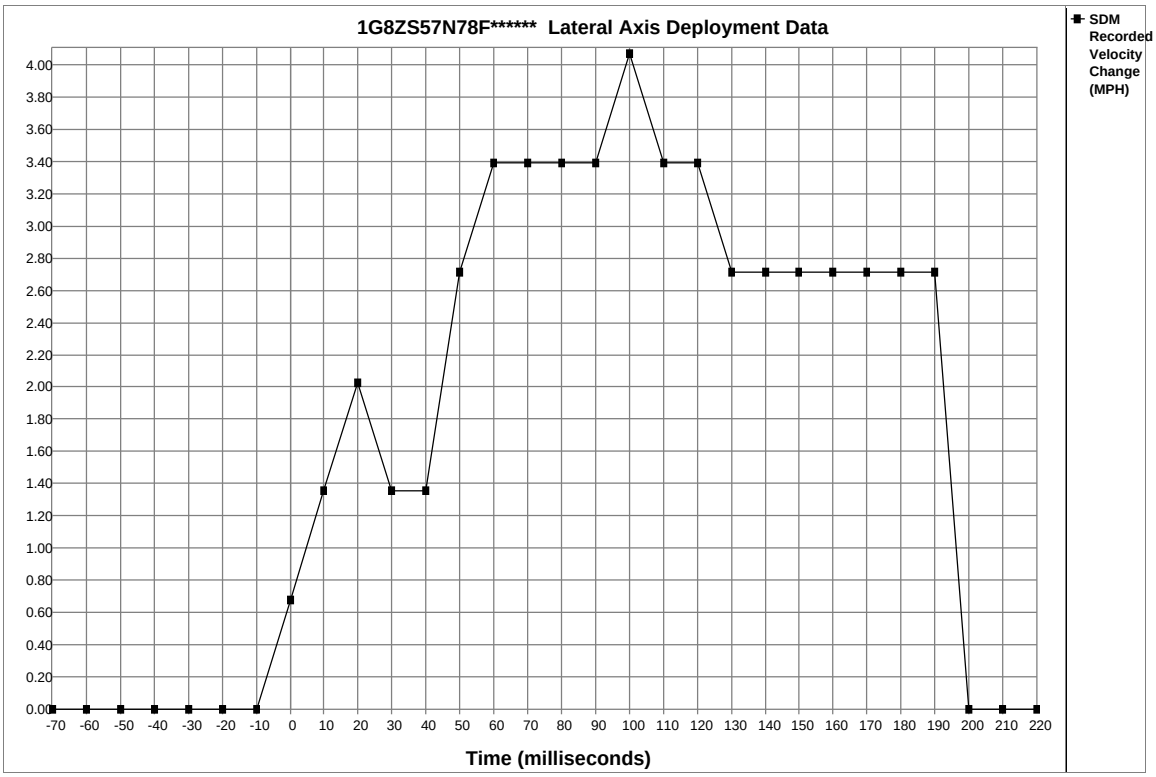
Parameter	-5 sec	-4 sec	-3 sec	-2 sec	-1 sec
Vehicle Speed (MPH)	95	87	77	63	21
Engine Speed (RPM)	2624	2368	2048	1536	704
Percent Throttle	17	16	14	10	7
Brake Switch Circuit Status	ON	ON	ON	ON	ON
Accelerator Pedal Position (percent)	0	0	0	0	0
Antilock Brake System Active (If Equipped)	No	No	Yes	Yes	Yes
Lateral Acceleration (feet/s^2)(If Equipped)	-2.46	2.46	0.00	20.51	0.00
Yaw Rate (degrees per second) (If Equipped)	0	1	1	14	25

Parameter	-5 sec	-4 sec	-3 sec	-2 sec	-1 sec
Steering Wheel Angle (degrees) (If Equipped)	Invalid	Invalid	Invalid	Invalid	Invalid
Vehicle Dynamics Control Active (If Equipped)	No	No	No	No	No

System Status At Deployment

Ignition Cycles At Investigation	978
SIR Warning Lamp Status	OFF
SIR Warning Lamp ON/OFF Time (seconds)	554240
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	976
Ignition Cycles At Event	977
Ignition Cycles Since DTCs Were Last Cleared	254
Driver's Belt Switch Circuit Status	UNBUCKLED
Passenger's Belt Switch Circuit Status	UNBUCKLED
Diagnostic Trouble Codes at Event, fault number: 1	N/A
Diagnostic Trouble Codes at Event, fault number: 2	N/A
Diagnostic Trouble Codes at Event, fault number: 3	N/A
Diagnostic Trouble Codes at Event, fault number: 4	N/A
Diagnostic Trouble Codes at Event, fault number: 5	N/A
Diagnostic Trouble Codes at Event, fault number: 6	N/A
Automatic Passenger SIR Suppression System Validity Status at AE	Valid
Automatic Passenger SIR Suppression System Status at AE	Air Bag Suppressed
Automatic Passenger SIR Suppression System Validity Status at First Deployment Command	Valid
Automatic Passenger SIR Suppression System Status at First Deployment Command	Air Bag Suppressed
Driver 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	24
Driver 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	26
Passenger 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Suppressed
Passenger 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Suppressed
Driver Side or Roof Rail/Head Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Passenger Side or Roof Rail/Head Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Time Between Events (sec)	N/A
Driver First Stage Deployment Loop Commanded	Yes
Driver Second Stage Deployment Loop Commanded	Yes
Driver Side Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop Commanded	Yes
Driver (Initiator 1) Roof Rail/Head Curtain Loop Commanded	No
Driver (Initiator 2) Roof Rail/Head Curtain Loop Commanded	No
Driver Knee Deployment Loop Commanded	No
Passenger First Stage Deployment Loop Commanded	No
Passenger Second Stage Deployment Loop Commanded	No
Passenger Side Deployment Loop Commanded	No
Passenger Pretensioner Deployment Loop Commanded	Yes
Passenger (Initiator 1) Roof Rail/Head Curtain Loop Commanded	No
Passenger (Initiator 2) Roof Rail/Head Curtain Loop Commanded	No
Passenger Knee Deployment Loop Commanded	No
Driver Anchor Pretensioner Deployment Loop Commanded (If Equipped)	No
Second Row Left Pretensioner Deployment Loop Commanded	No
Third Row Left Roof Rail/Head Curtain Loop Commanded	No
Passenger Anchor Pretensioner Deployment Loop Commanded (If Equipped)	No
Second Row Right Pretensioner Deployment Loop Commanded	No
Third Row Right Roof Rail/Head Curtain Loop Commanded	No
Second Row Center Pretensioner Deployment Loop Commanded	No
Driver 2nd Stage Deployment Loop Commanded for Disposal	No
Passenger 2nd Stage Deployment Loop Commanded for Disposal	No
Crash Record Locked	Yes
Vehicle Event Data (Pre-Crash) Associated With This Event	Yes
Deployment Event Recorded in the Non-Deployment Record	No
Event Recording Complete	Yes

Time (milliseconds)	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70
SDM Longitudinal Axis Recorded Velocity Change (MPH)	0.00	0.00	0.00	0.00	0.00	-2.03	-3.39	-4.74	-6.10	-7.46	-10.17	-12.88	-16.27	-17.62	-19.66
Time (milliseconds)	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220
SDM Longitudinal Axis Recorded Velocity Change (MPH)	-23.05	-26.44	-27.79	-28.47	-29.82	-30.50	-30.50	-31.18	-31.18	-31.18	-30.50	-30.50	0.00	0.00	0.00



Time (milliseconds)	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70
SDM Lateral Axis Recorded Velocity Change (MPH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	1.36	2.03	1.36	1.36	2.71	3.39	3.39
Time (milliseconds)	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220
SDM Lateral Axis Recorded Velocity Change (MPH)	3.39	3.39	4.07	3.39	3.39	2.71	2.71	2.71	2.71	2.71	2.71	2.71	0.00	0.00	0.00